Gold adsorption onto activated carbon in the presence of viscosity modifiers

R. A. Lauten[1]

1.
Senior scientist, Pionera, Sarpsborg, Norway rolf.andreas.lauten@pionera.com, MAusIMM

ABSTRACT

Milling of gold ores to obtain the required particle size distribution for optimal gold recovery can produce CIL slurries with high viscosities. A CIL slurry with high viscosity may limit the upper solids density practical to use in a plant. In addition to handling, a high slurry viscosity may also be detrimental for aeration, which in turn either decreases the leach kinetics and/or reduces the final leach recovery. Depending upon the mineralogy of the gold ore, viscosity modifiers can be used to reduce the viscosity of the CIL slurry. Reduction of the CIL slurry viscosity can improve the aeration, and indirectly accelerate the leach kinetics. Use of viscosity modifiers to lower the CIL slurry viscosity may allow a higher solids content in the CIL process and may reduce the overall water demand. If the gold leach kinetics are not affected, lower slurry viscosity may allow a higher throughput in the process from an increase in the slurry solids content. Viscosity modifiers lower the viscosity by adsorbing onto dispersed minerals in the CIL slurry. Activated carbon likely represents the mineral with the highest available surface area in the CIL slurry and may adsorb more than its share of viscosity modifier. We present data from an investigation where the gold adsorption capacity of several types of activated carbon is investigated in a synthetic ore. Some viscosity modifiers of different types are added to simulate viscosity reduction and the gold material balance is established to determine how viscosity modifiers modify gold adsorption onto activated carbon at high and low levels of gold in solution.

Key words: CIL, gold adsorption capacity, slurry viscosity, viscosity modifiers